THE GAINS FROM TRADE ONCE AGAIN[1]

By JAGDISH BHAGWATI

In a pair of brilliant, companion papers Professors Paul Samuelson [**6**] and Murray Kemp [**2**] have carried the analysis of the gains from trade (derived by a single country) significantly beyond Samuelson's classic contribution [**4**] of 1939.

While the majority of the theorems stated in these papers are valid, including the significant extension of the theorem that *free trade is superior to no trade* to the case of countries enjoying monopoly power in trade, the analysis needs to be qualified and can be extended in respect of two important theorems stated (only) by Professor Kemp.

More specifically, the following theorem needs to be qualified: that, for a country with neither monopoly power in trade nor domestic distortions, *a higher tariff is inferior to a lower tariff*. Moreover, Kemp's remarkable theorem that *restricted trade is superior to no trade* is valid only if the restriction results from tariffs, quotas or exchange restrictions and cannot be sustained as a logically true proposition if taxes and subsidies on domestic production or consumption are introduced, quite legitimately, as possible methods of trade restriction.

Section I begins with a restatement of the proof of Samuelson's classic theorem that *free trade is superior to no trade*, stating the proof in a way which brings out certain essential aspects with greater emphasis. Section II discusses Kemp's proposition that *restricted trade is superior to no trade* in relation to trade-restricting policies other than tariffs and (equivalent) quotas or exchange restrictions. Section III shows Kemp's contention that, for a small country, *a higher tariff is inferior to a lower tariff* needs to be qualified unless inferiority of the exportable commodity in social consumption is ruled out.

I. Free trade vs. no trade

The proposition that *free trade* (in the sense of a policy resulting in the equalization of domestic and foreign prices, and hence excluding policies such as trade, production and consumption taxes, subsidies and quotas) *is superior to no trade* has been proved in Samuelson's 1939 [**4**] and recent [**6**] papers. The precise sense in which it is valid, and the conditions under which it can be interpreted as an *efficiency rule* by systems not using the price mechanism, are brought out clearly by recasting Samuelson's basic argument along the following lines where a sharp distinction is drawn between technical efficiency and utility improvement and emphasis is

[1] I wish to thank Professors Murray Kemp and Paul Samuelson for valuable correspondence and Mr. V. K. Ramaswami for discussion of Section III.

pointedly placed on the fact that the proposition that *free trade is superior to no trade* relates to a competitive price system whereas the fact that the *opportunity* to trade (i.e., the trade situation) is superior to the no-trade situation holds regardless of the institutional assumptions made.

For simplicity, assume that the productive factors are fixed in supply, that the country has no monopoly power in trade and that the technology is such as to result in a strictly convex production possibility set.[1] The following three propositions can then be established.

Proposition 1: The trade situation (i.e., the opportunity to trade) is superior to the no-trade situation (i.e., the absence of trade opportunity), from the viewpoint of technical efficiency.

Proposition 2: Under perfect competition, free trade will enable the economy to operate with technical efficiency.

Proposition 3: Under perfect competition, free trade will enable the economy to maximize utility, subject to the given constraints, so that, from the viewpoint of utility-wise ranking as well, free trade is superior to no trade.

For Proposition (1), remember that technical efficiency is defined in the usual, Paretian sense. Hence Proposition 1 merely states that it is *possible* to get more of one good and no less of the other when the opportunity to trade is available than when it is not.

This is readily seen in Fig. 1, similar to Samuelson's illustration, where the price-line $CD = EF$ represents the international prices and OAB the production possibility set. If production is set at P and trade is undertaken (as it must be) at the stated international prices, OEF becomes the availability set and EF the availability frontier, the Pareto-efficient locus of available combinations of the two commodities. But if production is set instead at P^*, the availability set is the *largest* possible, at OCD, and CD represents the most efficient, Pareto-optimal availability line subject to the domestic and foreign transformation constraints.[2] On the other hand, AB, the production possibility frontier, represents the efficient, availability line in the absence of trade opportunity.

It is thus clear immediately, since CD lies uniformly outside AB (though

[1] The first assumption is not necessary for proving any of the three propositions that follow, as reference to Samuelson [**6**] and Kemp [**2**] will show. It is being introduced here merely to simplify the analysis and keep to a geometrical exposition without difficulty. On the other hand, note that the assumption of absence of monopoly power in trade *is* necessary for propositions (2) and (3), because they both refer to the optimality of free trade, which disappears where there is monopoly power in trade (as discussed in p. 140, n. 1). *However*, free trade, while not being the optimal policy when there is monopoly power in trade, is none the less a superior (though sub-optimal) policy to no trade, as Kemp [**2**] has shown.

[2] Note that any shift of production from P^*, and trade therefrom, to production at another point (such as P) and trade from that new point will only *reduce* the availability set open to the economy. Hence, production at P^* represents the most efficient production point, from which trade can be conducted.

touching it at P^*), that *any* bundle of commodities which is available by production alone (i.e., in the no trade situation) *can* be improved upon (with one borderline case at P^*) by production at P^* and trade therefrom.

Hence, the *opportunity* to trade represents for the economy a superior situation than the absence thereof. In other words, the trade situation is

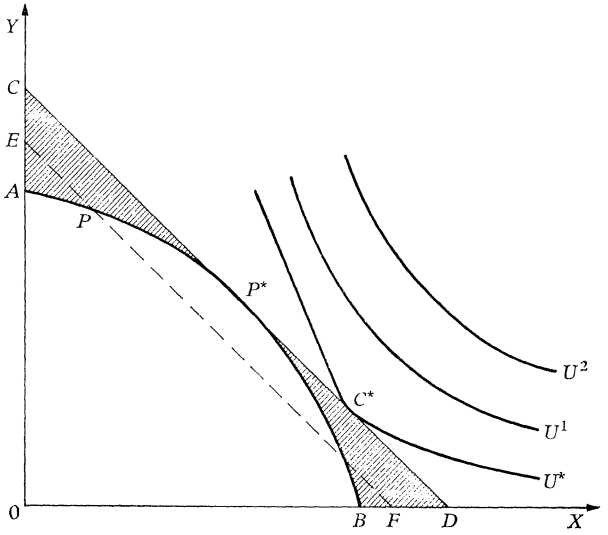

FIG. 1. Without trade, APP^*B represents the production possibility, and hence availability (or consumption possibility), frontier. If unlimited trade is possible at the world price ratio given by CD's slope, the new availability frontier is given by CP^*D, the farthest-out line with slope CD that touches the domestic, production possibility frontier. Any domestic welfare function (of the standard, static variety) will be maximized at a point such as C^*, which gives more welfare than any point within APP^*B (save in the singular case where C^* and P^* happen to coincide).

superior to the no trade situation (in the sense of Paretian, technical efficiency).

Note that this proposition merely states that it is *possible*, if the trade opportunity is exploited in a certain way, to have more of one good and no less of the other(s) under trade than under no trade. The proposition does *not* assert anything as to whether a specific, economic system will in fact manage to utilize the trade opportunity in this technically efficient manner. Of course the proposition that trade *could* expand the economy's availabilities is hardly surprising once one realizes that the possibility of trade really adds yet another 'technological' process of transforming exportables into importables, and this cannot but improve (or, at worst, leave unchanged) the availabilities defined by the *domestic* resource and technological constraints.

On the other hand, Proposition 2 relates explicitly to whether an actual, institutional system will operate with *technical* efficiency. It states that, for

a competitive price system, free trade *will* in fact enable the economy to exploit the trade opportunity most effectively and thus operate efficiently [i.e., bring production to P^* and trade along CP^*D in Fig. 1]. The proof of this proposition is straightforward and rests on the fact that with (i) free trade, constituting the equalization of foreign and domestic prices, and (ii) perfect competition, with the assumed technology, assuring the equalization of domestic prices with the marginal rate of transformation in production (on the production possibility frontier), the economy must necessarily end up producing and trading efficiently. To illustrate, under free trade at price $CD = EF$, the economy *will* produce at P^* and trade along CD, thus operating with technical efficiency.

Note further that Proposition 2 can be readily adapted for institutional frameworks other than that of a competitive, price system. Thus, for an economic system which does not use (domestic) prices to guide production, it is conceivable that an alternative way of operating with efficiency would be for planners to follow the rule of *equating foreign prices with the marginal rate of transformation of products in domestic production.*[1] This efficiency rule would ensure the operation of the economy at technical efficiency; in Fig. (1), the planners would be guided by the rule of producing at P^* and thus trading along CP^*D. Free trade merely happens to be the policy which enables a competitive, price system to implement this efficiency rule.[2]

It is now possible to go beyond questions of technical efficiency and raise the issue of utility-wise ranking of free trade and no trade. If we take a well-ordered, social utility index, Proposition 3 follows immediately.[3] For

[1] For a country, however, which enjoys monopoly power in trade, the rule modifies to the well-known prescription to equate the marginal terms of trade with the marginal rate of transformation in domestic production. The rule can be obtained more directly by maximizing the availability of one commodity subject to specified level(s) of the other(s), subject further to the constraints imposed by the implicit, domestic transformation function and the foreign reciprocal demand function.

[2] Following on this, I have found it useful, in the classroom, to tell my Indian students that even a 'Soviet-type' economic system, which may decide to avoid the use of prices to guide domestic allocation of resources, cannot afford to ignore international prices, the reason being that they really represent, from the welfare point of view, a 'technological' datum. I may also add that the distinction between Propositions 2 and 3, based on the distinction between technical efficiency and utility maximization, is also very useful if one is teaching students living in a 'planned' economy; Professor Bent Hansen, who has taught in Cairo for some years, told me some time ago that he has also found it useful to teach free trade optimality in terms of Propositions 1 and 2 above.

[3] Formally, we would be maximizing a function such as $U = U(X, Y)$ where U stands for social welfare, X and Y for the available commodities and the function has the standard properties [5] such as

$$\frac{\partial U}{\partial X} > 0, \frac{\partial U}{\partial Y} > 0, \frac{dX}{dY}\Big|_{U=\text{constant}} < 0 \quad \text{and} \quad \frac{d^2X}{dY^2}\Big|_{U=\text{constant}} < 0.$$

This function would be maximized subject to the implicit, domestic transformation function and the foreign reciprocal demand function. It would then be shown that, under free trade, a perfectly competitive system would satisfy the investigated maximizing conditions.

those not anxious to raise questions about the incomparability of different persons' utilities and who are ready to accept a well-ordered social utility index, this procedure is entirely satisfactory.[1] But those who, reluctant to go beyond consideration of utility for each (incomparable) individual, wish to base utility-wise rankings on the superior-for-all-income-distributions criterion may prefer the approach of utility-possibility loci comparisons

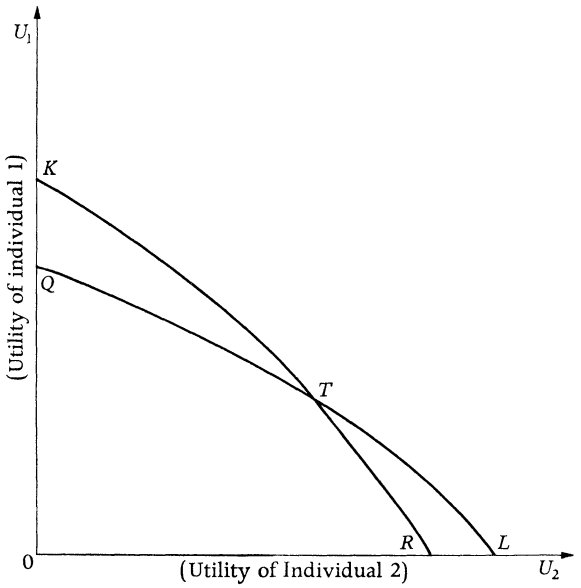

FIG. 2. QTR represents the utility possibility curve, in a two-person economy, corresponding to the no trade situation. KTL represents the utility possibility curve corresponding to the free-trade situation. KTL lies uniformly outside QTR (though touching it at T), indicating that the free-trade situation is superior (or, at minimum, equivalent) to the no-trade situation from the viewpoint of social welfare.

used by Samuelson [**6**] and Kemp [**2**]. They argue, quite correctly, that the fact that CD, the availability frontier under free trade, lies uniformly outside (though once touching) AB, the availability frontier under no trade, implies that the utility possibility locus for the free trade situation must also lie uniformly outside (though possibly touching) that for the no-trade situation, as illustrated in Fig. 2 for a two-person economy. This implies that, under free trade, for *any* utility distribution (except at the point(s) where the two loci touch)[2] achieved under no trade, it is possible (via ideal

[1] For those unwilling to assume that *laissez-faire* can be counted on to provide the ethically proper income distribution and yet want to use a social utility index, Samuelson's [**6**] construction of 'social indifference curves' is the appropriate reference.

[2] As Professor Samuelson has pointed out to me in correspondence, the free-trade utility possibility locus may even coincide with the no-trade utility possibility locus if all individuals are alike and have unitary income elasticities, and if C^* in Fig. 1 coincides with P^*.

lump-sum taxes and subsidies) to achieve a higher level for both individuals. Hence, *free trade is* (unambiguously) *superior* (or, at minimum, equal) *to no trade* (for all income distributions).[1]

II. Restricted trade vs. no trade

Kemp [**2**] has further argued that, for utility-wise ranking, *restricted trade is superior to no trade*. While all forms of trade cannot be shown to be (always) superior to no trade,[2] can the classes of trade considered be narrowed down to 'restricted trade' and this sub-set be shown to be superior to no trade?

Kemp is certainly right when the restriction is brought about by three classes of policies: tariffs, quotas, and exchange restrictions. Each of these policies will restrict trade by introducing an inequality between foreign prices on the one hand and domestic prices faced by producers and consumers on the other hand. These *are* in fact the policies spelled out by Kemp in his statement of the theorem. Thus he argues [**2**]:

> In the present section I shall argue the more general proposition that compensated free trade or compensated restricted trade is better than no trade. (It is understood, of course, that the restrictions are not prohibitive). The manner in which trade is restricted is unimportant; the same conclusions hold for tariffs, quantitative commodity controls or exchange restrictions.

But suppose, however, that trade is restricted by a production subsidy (or, alternatively tax) on importables (or, alternatively exportables)—a method which is not merely a theoretical possibility but also frequently in vogue. Kemp's theorem cannot be extended to this case, as seen by reference to Fig. 3 where a production subsidy (or, alternatively tax) on Y

[1] Note, however, that while it is correct to argue that (utility-wise) free trade is superior to no trade, it is *not* true that *any kind of trade* is better than no trade.

Samuelson states, in his earlier 1939 paper [**4**, p. 239], that 'free trade or some trade is to be preferred to *no* trade at all'. In the later 1962 paper in this *Journal* [**6**] as well, the argument is stated in terms of 'some trade'. 'Some trade', however, is *not* to be interpreted as equivalent to 'any trade'; and it should be noted that Samuelson's method of proof indeed fully supports this presumption. In correspondence Professor Samuelson has pointed out that this is definitely the proper interpretation of his theorem.

It can be easily shown in fact that any kind of trade cannot be shown to be superior to no trade. Take, for example, Figure 3 in the text. It shows that, for an economy with no monopoly power in trade, a production subsidy (or, alternatively tax) on commodity Y (or, alternatively X) can bring domestic prices for producers to D_P and production to P_T, consumption (at international prices F_P) to C_T and social utility locus U_S ($> U_T$). Thus a policy of trade (involving specifically a production tax-cum-subsidy policy combined with otherwise-free trade) is inferior to that of no trade for the specific income distribution implicit in the social utility index employed, and hence it will be impossible, in this instance, for the gainers in the trade situation to compensate the losers without themselves becoming worse off than in the no-trade situation. This conclusion is readily understandable because, as we know from the theory of Second Best, it is not possible in general to rank uniquely (for all income distributions) two sub-optimal policies: and, trade and no trade are both sub-optimal policies for a country with no monopoly power in trade (unless trade amounts specifically to free trade, which is the optimal policy).

[2] This has been shown in the preceding footnote.

(or, alternatively X) has reduced trade below the free-trade level but the welfare level at U_T is below the no-trade welfare level at U_S. On the other hand, if productive resources are assumed to be given in supply and monopoly power in trade is absent, Kemp's theorem can be shown to be valid (for utility-wise ranking) even for a production subsidy (tax) on importables (exportables) *as long as* the subsidy is not so large as to increase

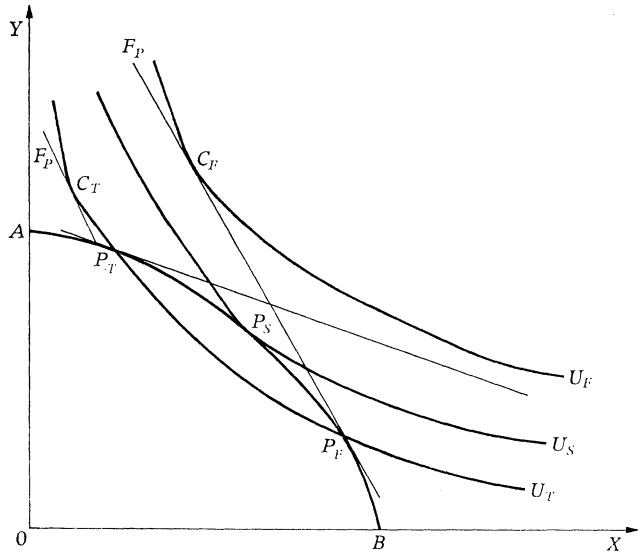

FIG. 3. $AP_S B$ represents the domestic, production possibility curve. In the absence of trade, the welfare level is at U_S. Under free trade at the given world price ratio measured by the slope of F_P, welfare will increase ($U_F > U_S$). If, however, an appropriate subsidy (or, alternatively tax) on the production of Y (or, alternatively X) is introduced *along with* otherwise-free trade, production will shift to P_T and consumption to C_T, the volume of trade will be reduced below the free-trade level, and the welfare level reduced *below* that under no trade ($U_T < U_S$), thus demonstrating that restricted trade would, in this instance, be inferior to no trade.

the domestic production of importables above the no-trade level. A larger subsidy (tax) than this would open up the *possibility*, illustrated by Fig. 3, of subsidy (tax) restricted trade being inferior (for the assumed, social utility index) to no trade, such that no lump-sum transfers could compensate the losers in the restricted trade situation without leaving the gainers worse off.

Kemp's theorem is again invalid, in general, if we consider yet another way in which trade may be reduced *below* the level of free trade. Even a production subsidy (tax) on exportables (importables) may restrict the volume of trade below the free-trade level provided exportables are inferior in social consumption.[1] And, regardless of whether trade is reduced

[1] Such a subsidy (tax) may, of course, reverse the trade pattern as well.

below or increased above the free trade level, a production subsidy (tax) on exportables (importables) can reduce social welfare below the no-trade level so that it will, in this case, be impossible to compensate the losers in this restricted trade situation while keeping the gainers at their welfare level in the initial, no trade situation. This is illustrated in Fig. 4 where the subsidy (tax) is assumed to shift production to P_T, reduce trade below the

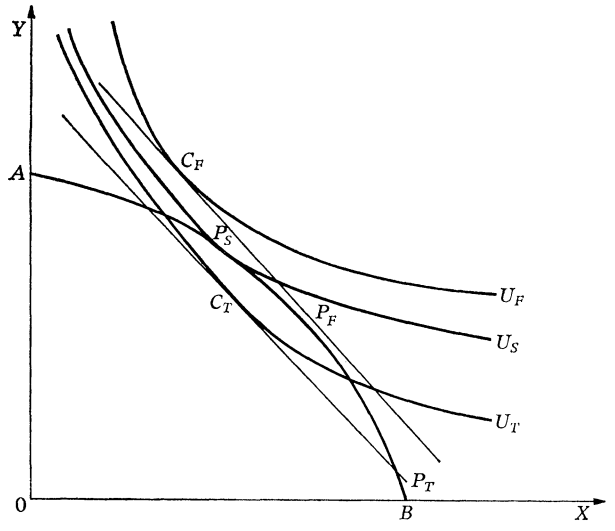

FIG. 4. $AP_S B$ represents the domestic, production possibility curve. Free trade at given, world prices measured by the slope of $C_F P_F$, would take production to P_F and consumption to C_F. Under no trade, the production and consumption would be at P_S and welfare at U_S would be below that under free trade at U_F. An appropriate production subsidy (or, alternatively tax) on the exportable good (or, alternatively on the importable good) would shift production from P_F to P_T, consumption to C_T, thus reducing the volume of trade *below* the free-trade level and welfare *below* the no trade level ($U_T < U_S$), thus demonstrating that restricted trade would, in this instance, be inferior to no trade.

free trade level and produce welfare level below that under no trade ($U_T < U_S$).

Hence, if subsidies (taxes) on importables and exportables are admitted as possible ways of restricting trade, the theorem that restricted trade is superior to no trade can no longer be considered valid.

Further, we have discussed so far only taxes and subsidies on *production* as methods by which trade may be restricted. We may, however, also consider taxes and subsidies on *consumption* as possible methods of restricting trade. If we do so, Kemp's theorem can be shown again to be invalid, in general, for this class of policy instruments.[1]

[1] Note again that Kemp was implicitly considering restrictions of trade brought about by tariffs and equivalent restrictions. What has been demonstrated here is that the theorem is not capable of extension, in general, to restrictions of trade brought about by other policy instruments (except under restrictive assumptions).

Take the case of tax (subsidy) on the consumption of importables (exportables). In this case, even when fixed resources and absence of monopoly power in trade are assumed to simplify the analysis, restricted trade may be inferior to no trade. This is illustrated in Fig. 5 where the trade-reducing consumption subsidy (tax) on exportables (importables) is shown to result in welfare deterioration below the no-trade level ($U_T < U_S$). Note

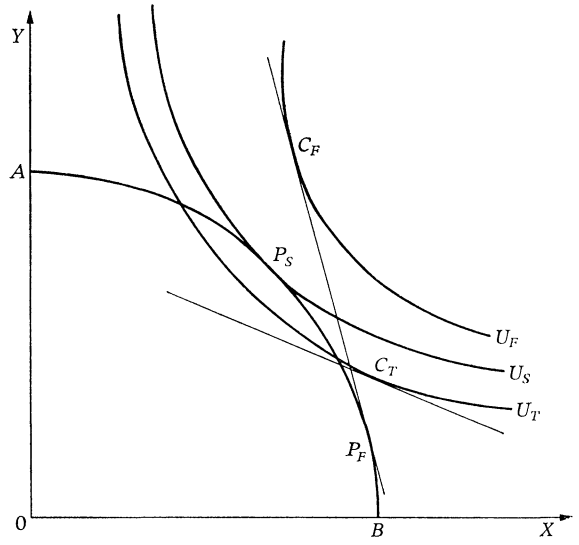

FIG. 5. AP_SB is the domestic, production possibility frontier. Under no trade, production and consumption will be at P_S. Under free trade, at the given world price ratio measured by the slope of $C_F P_F$, production will be at P_F, consumption at C_F and social welfare at U_F. If, however, along with otherwise-free trade, an appropriate subsidy (or tax) on the consumption of the exportable good (or of the importable good) is introduced, production will continue at P_F and consumption shift to C_T, the volume of trade will have been reduced below the free-trade level and welfare below the no-trade level ($U_T < U_S$), thus demonstrating that, in this instance, restricted trade is inferior to no trade.

that this possibility does not require any restriction on demand, such as inferiority of either good in social consumption, as in the case of production subsidy (tax) on importables (exportables).[1]

III. Higher tariff vs. lower tariff

A further theorem, stated by Kemp, is that for a country with no monopoly power in trade, and without any domestic distortions, a higher tariff is inferior to a lower tariff. As Kemp [**2**, p. 814] states it:

What can be said of the relative desirabilities of the free-trading situation, the trading situation characterized by a uniform 5% import duty, that characterized by a 10% duty, etc.?

[1] On the other hand, if a trade-reducing tax (subsidy) is levied on the consumption of exportables (importables), this can be shown to result invariably in a higher welfare level than under no trade when there is no monopoly power in trade and resources are fixed in supply.

In the special case in which a country's terms of trade are independent of that country's offer a particularly simple answer can be given: the free-trade situation is superior to the 5% situation, which in turn is superior to the 10% situation, and so on. The reason is very simple: under free trade all the necessary marginal conditions of a Paretian national optimum are satisfied. In particular, the marginal rate of transformation between commodities in production is equal to the marginal rate of transformation between commodities in international trade (the marginal terms of trade) and to their marginal rate of substitution in consumption. A tariff destroys the equality between the marginal terms of trade and the other two marginal rates of transformation. And the greater the duty, the greater the resulting inequality.

While Kemp's argument seems valid at a superficial glance, and indeed was adopted as such in my own Survey [**1**], it turns out that it raises certain difficulties when inferiority of the exportable good in consumption is not ruled out.

Note that the argument is certainly valid if the ranking of tariffs is made on grounds of (what was earlier described as) technical efficiency. However, when the question of utility-wise rankings is considered, it can be shown, as in Fig. 6, that a higher tariff rate could produce a higher level of welfare than a lower tariff rate. It is clear that this contradiction requires that the exportables be inferior in social consumption. The *volume* of trade, in this instance, falls instead of increasing as a result of a reduction of the tariff. Readers familiar with Meade's [**3**] cardinalist method of evaluating the marginal changes in welfare will notice that the foregoing result can naturally be reached by Meade's method as well: a reduction in the volume of imports, when there is a tariff, will produce a deterioration of welfare.

While, however, the presence of an inferior exportable good *can* result in a higher tariff producing higher social welfare than a lower tariff, Professor Samuelson has pointed out to me that there will none the less exist *other* equilibrium position(s) under the lower tariff situation which produce a higher level of welfare than under the higher tariff, and that my qualification of Kemp's proposition is yet another instance of multiple equilibria with associated welfare paradoxes. Thus, if one draws a Hicksian income-consumption line at the domestic price ratio under the low tariff, it will go through C_L and to the left of C_H and must necessarily result in other equilibrium consumption point(s) further north, involving a higher welfare level than under U_H.[1]

The correct formulation of the valid position concerning the utility-wise ranking of higher and lower tariffs would then be that: the (best) utility possibility curve under a lower tariff will indeed lie outside that under a higher tariff, regardless of inferiority of the exportable good in social consumption; but a competitive price system could well result in equilibria involving a higher welfare level under a higher tariff, unless inferiority of

[1] The problems raised by inferior goods have been noted independently by J. Vanek [**7**] as well; his contribution came to my notice after this paper was complete.

the exportable good in social consumption were ruled out. It may be comforting, however, to note that this possibility of a perverse welfare result can be shown to require market instability. But, for those who see no reason to reject the empirical possibility of market instability, this is small comfort indeed.

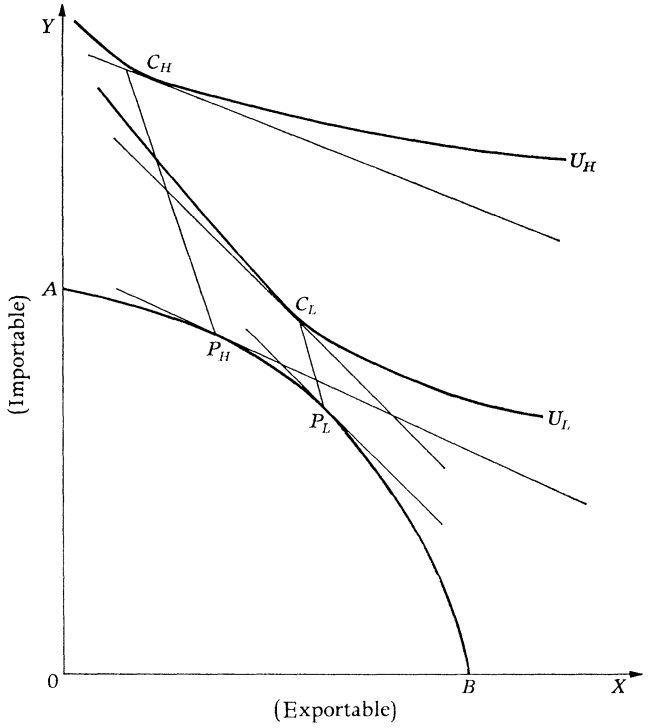

FIG. 6. $AP_H P_L B$ is the domestic, production possibility frontier. An appropriate tariff will lead to production at P_L, consumption at C_L, trade at the given world price ratio measured by the slope of $P_L C_L$ and social welfare at U_L. An appropriate, *higher* tariff will shift production to P_H and consumption to C_H, while increasing social welfare ($U_H > U_L$), so that a higher tariff will be superior to a lower tariff in this instance. Note that this case requires the inferiority of the exportable good in social consumption; it is impossible to redraw the diagram, with the same conclusions, for the case where the exportable good is not inferior.

IV. Conclusion

We have thus established that:

(1) 'restricted trade is superior to no trade' only if the restriction is brought about by tariffs, quotas, or (equivalent) exchange restrictions but not if brought about by taxes or subsidies on domestic production or consumption; and

(2) 'a higher tariff is (utility-wise) inferior to a lower tariff', for a country with neither monopoly power in trade nor domestic distortions, only when inferiority of exportables in societal consumption is ruled out; if this is not

done, a competitive system may well lead a reduced tariff to result in a deterioration of economic welfare, even though the possibility of improved economic welfare, at a different equilibrium position with the same reduced tariff, will always exist.

REFERENCES

1. Bhagwati, J., 'The pure theory of international trade: a survey', *Economic Journal*, vol. 74, Mar. 1964.
2. Kemp, M. C., 'The gain from international trade', *Economic Journal*, vol. 72, Dec. 1962.
3. Meade, J. E., *The Theory of Customs Unions* (Amsterdam: North Holland Publishing Co., 1955).
4. Samuelson, P. A., 'The gains from international trade', *Canadian Journal of Economics and Political Science*, vol. 5, May 1939; reprinted in *Readings in the Theory of International Trade*, edited by Howard S. Ellis and Lloyd A. Metzler (Philadelphia, 1949).
5. —— 'Social indifference curves', *Quarterly Journal of Economics*, vol. 70, Feb. 1956.
6. —— 'The gains from international trade once again', *Economic Journal*, vol. 72, Dec. 1962.
7. Vanek, J., *General Equilibrium of International Discrimination*, Harvard University Press, 1965.

Delhi School of Economics